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ABSTRACT

The generic workplace curricula in this document were developed in a workplace education project conducted in Pima County, Arizona, which served 524 workers (58 percent from minority groups) at 14 worksites. Generic curriculum and competencies were developed for each subject area rather than each specific worksite. Of 374 workers who completed the classes 208 tested higher in basic skills, 143 improved their communication skills, and all documented increases in self-esteem. This report contains the generic workplace curricula and competencies developed for the following courses: English as a second language, reading, writing, mathematics fundamentals, mathematics for statistical process control, algebra, communication and listening, and problem solving. An external evaluation report is also included. (KC)

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ED 384 752

# Pima County Adult Education

*WORKPLACE EDUCATION PROJECT*

## PIMA COUNTY WORKPLACE LITERACY PARTNERSHIP

**V198A30184**

**FINAL REPORT**

**MAY 1, 1993 - APRIL 30, 1995**

U.S. DEPARTMENT OF EDUCATION
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**NATIONAL WORKPLACE LITERACY PROGRAM**
**INFORMATION FORM**

**Pima County Adult Education**
**Workplace Education Project**
**Final Report**
**May 1, 1993 - April 30, 1995**

## Part 1: Program Parameters

1. Target No. to be Served: 300

4. Fed. Funds Obligated: $235,822

5. Matching Funds/ In-Kind: 92,695.54

6. Value Release Time: $37,509.40

2. No. Served at Each Site to Date:

| | This qtr/to date | | |
|---|---|---|---|
| Site 1. | 169 | Site 7. | 13 |
| Site 2. | 36 | Site 8. | 130 |
| Site 3. | 14 | Site 9. | 9 |
| Site 4. | 54 | Site 10. | 18 |
| Site 5. | 11 | Site 11. | 18 |
| Site 6. | 10 | Site 12. | 12 |
| | | Site 13. | 11 |
| | | Site 14. | 19 |

7. No. Participating in Programs Offered

| | |
|---|---|
| Basic Skills | 389 |
| GED | |
| ESL | 135 |

3. Total No. Served: 524

8. Contact Hours Provided: 11,079
average # of weeks in training cycle = 10
average # of hours of instruction per cycle = 30
average # of hours of instruction per week = 3

| | | | | |
|---|---|---|---|---|
| Site 1 | Hughes | Site | 7 | Tucson Rubber |
| Site 2 | Brush Wellman | Site | 8 | Burr-Brown |
| Site 3 | Louv-Aire | Site | 9 | Westward Look |
| Site 4 | Concrete Designs | Site | 10 | AlliedSignal |
| Site 5 | IBM | Site | 11 | Westin La Paloma |
| Site 6 | U of A | Site | 12 | TriTronics |
| | | Site | 13 | Alpha |
| | | Site | 14 | Groundskeeper |

## Part 2: Participation Data

1. Mean Age Participants: 38

2. Sex: No. Males 186 No. Females 338

3. Race/Ethnicity: No. who are:

| | | | |
|---|---|---|---|
| White | 221 | Am. Indian/ Alaska Native | 9 |
| Black | 14 | | |
| Hispanic | 203 | Asian/Pacific Islander | 77 |

4. No. Single Head of Household: 170

5. No. Limited English Proficient: 142

| 6. Outcomes | No. Participants |
|---|---|
| a. Tested higher on basic skills | 208 |
| b. Improved communication skills | 143 |
| c. Increased productivity | |
| d. Improved attendance at work | |
| e. Increased self-esteem | 392 |

| 7. Years with the company | No. Participants |
|---|---|
| Unemployed | |
| 0-5 | 262 |
| 6-10 | 164 |
| 11-15 | 61 |
| 16-over | 37 |

## SITES AND NUMBER OF PARTICIPANTS SERVED

| | SITES | PARTICIPANTS SERVED |
|---|---|---|
| Site 1 | Hughes Aircraft Missile System Company | 169 |
| Site 2 | Brush Wellman | 36 |
| Site 3 | Louv-Aire | 14 |
| Site 4 | Concrete Designs | 54 |
| Site 5 | IBM | 11 |
| Site 6 | The University of Arizona | 10 |
| Site 7 | Tucson Rubber Company | 13 |
| Site 8 | Burr-Brown Corporation | 130 |
| Site 9 | The Westward Look Resort | 9 |
| Site 10 | AlliedSignal Controls & Accessories | 18 |
| Site 11 | The Westin La Paloma | 18 |
| Site 12 | TriTronics | 12 |
| Site 13 | Alpha Enterprises | 11 |
| Site 14 | The Groundskeeper | 19 |

## WORKPLACE LITERACY PARTICIPANTS BY WORKPLACE AND TYPE OF TRAINING

| | Reading | Writing | Math Fundamentals | Algebra | Technical Writing | Communication/Listening | Problem Solving | ESOL | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Hughes | 9 | 16 | 76 | 58 | 10 | | | | 169 |
| Brush Wellman | | 14 | 8 | 8 | | | | 6 | 36 |
| Louv Aire | 6 | | 8 | | | | | | 14 |
| Concrete Designs | | 20 | 20 | 14 | | | | | 54 |
| IBM | | | | | | | | 11 | 11 |
| U of A | | | | | | | | 10 | 10 |
| Tucson Rubber Co. | | | 7 | | | | | 6 | 13 |
| Burr-Brown | | 11 | 38 | 18 | | 10 | 11 | 42 | 130 |
| Westward Look | | | | | | 9 | | | 9 |
| AlliedSignal | | | | | | 18 | | | 18 |
| La Paloma | | | | | | | | 18 | 18 |
| TriTronics | | | | | | | | 12 | 12 |
| Alpha | | | | | | | | 11 | 11 |
| Groundskeeper | | | | | | | | 19 | 19 |
| **TOTAL** | 15 | 61 | 157 | 98 | 10 | 37 | 11 | 135 | 524 |

| CONTACT HOURS BY SITE | |
|---|---|
| COMPANY | CONTACT HOURS |
| Hughes | 2522 |
| Brush Wellman | 943 |
| Louv Aire | 400 |
| Concrete Designs | 947 |
| IBM | 162 |
| U of A | 285 |
| Tucson Rubber | 324 |
| Burr-Brown | 3434 |
| The Westward Look | 140 |
| AlliedSignal | 340 |
| The Westin La Paloma | 504 |
| Tritronics | 358 |
| Alpha | 258 |
| Groundskeeper | 462 |
| TOTAL | 11,079 |

## FINAL REPORT NARRATIVE

Pima County Adult Education's (PCAE) Workplace Education Project, funded under the National Workplace Literacy Program, provided workplace education classes at fourteen worksites to 524 workers. The worksites included: Hughes Missile Systems Company, Brush Wellman, the University of Arizona (Facilities Management), Louv-Aire, IBM, Tucson Rubber, Concrete Designs Inc., Tri-Tronics Inc., Burr-Brown Corporation, AlliedSignal Controls and Accessories, the Westin La Paloma, Alpha-Enterprises, the Westward Look Resort and the Groundskeeper.

### COMPARISON OF ACCOMPLISHMENTS TO OBJECTIVES

The following information compares actual accomplishments to the objectives contained in the approved application.

**Objective 1**
A minimum of 300 adults with inadequate basic skills will be recruited and provided with instruction in workplace classes; at least 50% of whom will be representatives of minority groups.

**Accomplishments**
Five hundred and twenty-four (524) workers were recruited and provided with instruction in on-site workplace classes, 58% of whom were representatives of minority groups.

**Objective 2**
A minimum of eight worksite locations, including at least 3 small businesses, will be served.

**Accomplishments**
Fourteen worksites, including five small businesses, were served. The small businesses include: TriTronics, Concrete Designs, Tucson Rubber, Louv-Aire, and Alpha Enterprises.

**Objective 3**
A minimum of 25 class cycles will be completed. A "class cycle" is a class held in a worksite location for an 8-10 week time period.

**Accomplishments**
Forty-three (43) class cycles were completed. The average class cycle was 10 weeks (20-80 hours of instruction). The class cycles ranged from 2 to 4 hour classes once a week for ten weeks (20 to 40 instructional hours) to classes twice a week for 10, 15, and 20 weeks (40 to 80 instructional hours).

**Objective 4**

All learners will be pre- and post-tested at the beginning and end of each cycle to measure the impact of job-specific basic skills instruction. Qualitative and quantitative tools will be developed to measure workplace outcomes such as improved productivity, increased attendance at work, increased employee readiness for promotions, increased self-esteem, decreased error rates, and reductions in waste, turnover, lost management time, and downtime.

**Accomplishments**

All learners were pre-tested and most of those that completed (376/72%) were post-tested. Educational gains as well as gains in self-esteem were obtained. It was difficult to obtain hard data on increased productivity and attendance at work because managers didn't always respond to these questions. Although we do not have hard data on increased productivity and attendance, managers who did respond to these questions felt that participating workers were either productive and had good attendance already or they had improved in these areas. The problem of managers not filling out the forms as well as the difficulty in linking improved basic skills with many of the above workplace outcomes is problematic.

**Objective 5**

Advisory committees will be formed at worksites that include workers, employers, and PCAE representatives in order to meet both worker and employer literacy goals and to ensure that the training is worker centered.

**Accomplishments**

Advisory Committees were formed which included representatives from the training or human resource department of the company, managers, students, instructors, and the Project Manager. The groups met a minimum of once a cycle to discuss how the class/es were going, any problems or concerns, suggestions for improvement, ideas for future classes, etc. The advisory committees were a very useful tool for keeping the classes relevant, participatory, and learner-centered. Aside from the Advisory Committees, we conducted on-site planning meetings and task analyses at every worksite, which incorporated workers' input. At certain locations, the Project Manager also spoke to the class as a whole in an effort to elicit as much feedback as possible.

**Objective 6**

Curriculum based on analysis of skills needed for job competencies will be developed, validated, refined and reproduced. Curriculum and other project information will be disseminated to the Curriculum Coordination Center, the ERIC Clearinghouse, the TEAMS network, and other workplace education providers. The project will be represented at one or more national or statewide conferences.

**Accomplishments**

During the 1991-1992 grant cycle, the instructors combined the common components of the company-specific curricula up until that point together by subject (reading, writing, math, and ESOL) and developed a generic curriculum for each content area. These curricula were used by instructors in the Workplace Education Project to customize from, rather than reinvent the wheel each time we began a class at a new company. The instructors in the basic skills area also developed job-specific matrices that linked competencies to jobs.

During the 1992-1993 grant cycle, the instructors updated the already existing generic curricula and revised them when appropriate. They also added a Communication and Listening Curriculum, a Problem-Solving Curriculum, and Job-Specific Matrices for both areas. Company-specific curricula were also developed for each individual site.

During this grant cycle (1993 - 1994), the staff again updated the existing generic curricula developed in the 1991-1992 and the 1992-1993 grant cycles and revised them when necessary. They added workplace generic competencies for each curriculum area and new job-specific matrices that match the competencies with a variety of job titles. Curriculum materials (curricula, competencies, and job-specific matrices) based on an analysis of skills needed for job competencies linked the goals of both the participating workers and the individual companies, making the instruction learner-centered and participatory. The result is a culmination of many years work and expertise.

The curricula, competencies, and job-specific matrices have been validated, refined, and reproduced. They have been disseminated to the Curriculum Coordination Center, the ERIC Clearinghouse, the TEAMS network, the National Workplace Literacy Program, and other workplace education providers. Through dissemination, these curriculum materials benefitted other workplace education providers as well as our own instructors.

Staff of Pima County Adult Education's Workplace Education Project presented at local, state, and national conferences. Linda Hellman, Project Manager, presented a workshop entitled *Workplace Education: Making It Work* at AAACE (American Association of Adult and Community Education) in November, 1993. Jane Brown, Lead Teacher presented on communications skills at AAACE the same year. Linda co-presented at the Project Directors' Close-Out Meeting in Washington, D.C. in November, 1994 on curriculum development. Linda also presented at TESOL (Teachers of English to Speakers of Other Languages) in March, 1995. Her presentation was entitled *Workplace Education Partnerships: Compromises, Promises, and Practices*. Jane Brown and Elaine Dow, ESOL Specialist, co-presented a workshop entitled *Teaming with Ideas: Teambuilding Activities for Workplace Education* at COABE (Commission on Adult Basic Education) in New Orleans, Louisiana in June, 1993. Margie Olson, an ESOL instructor in the Workplace Education Project presented a workshop for the training department of a participating employer on how to deal with non-native speakers of English in their training efforts.

## DISSEMINATION

The Project Manager and other staff members have disseminated information and materials in response to numerous requests from adult education providers, workplace education providers, and researchers. Through the numerous presentations, PCAE staff members have given out many handouts about various topics in workplace education and also disseminated materials developed in this grant cycle. Aside from presentations, the Workplace Education Project has sent information and materials developed in the Project to Praxis in Toronto, Ontario; OICW in Menlo Park, California; Joe Dempsey in Washington, DC; Gloria Burgoon in San Jose, California; and Los Abrigados Resort and Spa in Sedona, Arizona. Additionally, the Project Manager has spoken on the telephone to other providers and people requesting information about the Workplace Education Project.

The Workplace Education Project has also had a number of people visiting the program during the grant cycle. Marian Banfield from the U.S. Department of Education came as well as Miriam Burt from the National Clearinghouse for Literacy Education, Robert Schmazel from Central Arizona College and Magma Cooper Company Learning Center, Wilda Theobold and Linda Thomas from Phoenix Union Adult Basic Education, and Miquel Arciniega from English for Professionals in California.

## STAFF DEVELOPMENT

All staff involved in the Workplace Education Project received one-to-one and small group training with the Project Manager and Lead Teacher on an on-going basis. Topics covered included task analysis, assessment, curriculum writing, lesson planning, evaluation, and student support services. Teachers also met regularly to share ideas, lessons, etc. The Project Manager conducted on-going observations of classes at every workplace. Pima County Adult Education also has an extensive in-service staff development program and staff working in this Project benefitted from both PCAE's program and the specific training offered through the Workplace Education Project.

The Project Manager and the Lead Teacher are members of the local chapter of ASTD (American Society of Training and Development) and they attend a monthly meeting in which one training area is demonstrated. The Arizona Consortium for Education & Training (ACET), one of our "umbrella partners," also has monthly meetings where different training topics are highlighted. The Project Manager attends these meetings as well.

Several staff members of the Workplace Education Project attended various conferences on workplace literacy, adult education, and ESOL including COABE (Commission on Adult Basic Education) in New Orleans, Louisiana; TESOL (Teachers of English to Speakers of Other Languages) in Baltimore, Maryland and Long Beach California; AZ-TESOL in Phoenix, Arizona; Rocky Mountain TESOL in Tucson, Arizona; the Arizona Adult Education Conference in Phoenix, Arizona; AAACE in Dallas, Texas; and a workplace literacy conference in San Francisco, California.

In addition, the instructional staff went to Phoenix to visit Glendale Community College where Nancy Siefer, our outside evaluator, is a professor. Nancy organized a tour of the college's computer lab. She also facilitated a discussion about testing, availability of materials, and lesson planning. The teachers were all very inspired upon their return and said this was one of the best staff development opportunities that was offered.

## EVALUATION

The Workplace Education Project utilized Nancy Siefer as our outside evaluator. Her expertise in workplace literacy has been invaluable in guiding the Project and helping it become an exemplary program. Nancy's primary focus was quality. PCAE's Workplace Education Project worked with Nancy from the initial stages to the end of the grant cycle. Not only was the program evaluated on an on-going basis, but also each class, instructor, and student were evaluated. The four levels of evaluation which follow list who or what were evaluated in each level and by whom.

LEVELS OF EVALUATION

| What/Who is to be Evaluated | Evaluator |
|---|---|
| Worker | Instructor, supervisor, self |
| Instructor | Workers, self, Project Manager |
| Course | Workers, instructors, supervisors, Project Manager, outside evaluator |
| Program | Workers, instructors, supervisors, Project Manager, advisory committees, outside evaluator |

The Final External Evaluation Report is included with this Final Report.

## AWARDS & RECOGNITION

Linda Hellman, Project Manager of the Workplace Education Project, was the recipient of the YWCA of Tucson's Women on the Move Award in December, 1993. Her program was cited for assisting numerous workers in basic skills and her commitment to adult education.

## OUTCOMES

The following pages give statistics on the number and characteristics of project participants who did and did not complete the program as well as the measurable learning gains. In this

report, we have identified "completers" as the workers who completed two-thirds or more of the classroom time offered in each cycle.

Our statistics indicate that 376 participants (72%) out of 524 participants served completed project activities and 148 participants (28%) did not. Many of our "non-completers" were laid off while they were enrolled in workplace education classes. Since our goal was to train 300 workers, we are pleased that more workers than were targeted in the grant completed the programs at their worksites.

PCAE instructors pre-tested every participant at every location when he/she entered the workplace education class. The instructors post-tested at the end of each cycle, which ranged from 10-20 weeks in length. A total of 208 workers tested higher in basic skills and another 143 improved their communication skills. The 208 number was derived from workers that participated in the reading, writing, math, algebra, and problem-solving classes. The 143 number was derived from workers that attended the English to speakers of other languages (ESOL) classes and workers that took a class in communications. Three hundred and forty-two (342) completers and 13 non-completers had learning gains documented by pre-/post-test results or determined by teachers, supervisors, or workers themselves. All 376 completers and 16 non-completers documented increases in self-esteem.

In ESOL, PCAE used teacher-designed pre- and post-assessments which the instructors developed according to the requirements of each workplace. The tests were scored on a holistic scale of 0-6:

0 - pre-beginning
1 and 2 - beginning
3 and 4 - intermediate
5 and 6 - advanced

The test components included speaking, listening, reading, and writing. Students were scored on individual components and also received an average overall score. For example, a student might begin the class with an average overall score of 1.3 and post-test at 2.7. A sample ESOL pre- and post-test is included in the Appendix of this Final Report.

Several types of assessments were used in the basic skills areas, both standardized and teacher-made. For the math classes, the instructors either developed their own tests or used ones that were taken from the textbooks used in the class. In reading, the instructor created a reading assessment utilizing company material. The cloze approach was used on a passage taken from the employee handbook. Different selections were used for the pre- and post-tests.

In the writing classes, a student writing sample was taken. The writing samples were scored holistically. We also tested students using the Language Mechanics and Language Expression portions of the TABE (Tests of Adult Basic Education), Level A, Forms 5 & 6. Although the TABE uses grade levels to document results, we provided students and employers the results in a percentage format.

For communication skills classes, students were given a teacher-made pre- and post-assessment which focused on active listening; passive, assertive, and aggressive communication styles; and communication strategies. Students were also given two assessments, the SELF inventory and True Colors, to determine individual communication styles. These were not pre/post-test assessments.

In problem-solving classes, the pre-assessment tool was the Cornell Critical Thinking Test, Level X; the Level Z was used for the post-assessment. This assessment measured participants' abilities in logical, deductive and inductive reasoning, identifications of assumptions and predictions, and creative-thinking skills. A teacher-made assessment was also used to measure participants' understanding of flow charts, Ishikawa diagrams, check sheets and Pareto charts. Each student received an individual item analysis which pinpointed areas of strength and weakness.

After each class at every worksite, the Project Manager sent a letter to the company summarizing what happened during the class cycle, including a compilation of the evaluation results from both the class participants and the managers and the results of the pre/post-test scores. When the employers received the results of the pre- and post-test scores, the workers' names were not used and the results were reported in composite form. Students' learning gains from pre- to post-test are one indicator of how successful the classes have been and are a valuable marketing tool for continuing the program in the future.

## ADDITIONAL INFORMATION

In addition to our federal grant, the Workplace Education Project provided Skills Enhancement Classes to Arizona Department of Economic Security (DES) workers. This is an innovative project because it involves a partnership between two governmental agencies. The Workplace Education Project also provided classes for workers in companies that were not members of one of our partners or the class did not fit into the guidelines of what types of instruction PCAE could offer under the grant. These classes were provided on a fee-for-service basis.

As of May 1, 1995 PCAE's Workplace Education Project has been a totally fee-for-service provider. We believe that the money Pima County Adult Education received through four National Workplace Literacy Program funding cycles has positioned the Workplace Education Project to be a self-sustaining provider of basic skills instruction for the business community in Tucson, Arizona. We have many requests for our services and we are enthusiastic and optimistic about our future.

**NATIONAL WORKPLACE LITERACY PROGRAM**
**INFORMATION FORM**

**Pima County Adult Education**
**Workplace Education Project**
**May 1, 1993 - April 30, 1995**
**COMPLETERS**

**Part 1: Program Parameters**

1. Target No. to be Served: _____
   a. Total No. Served: _____
   b. No. of Completers: 376

4. Fed. Funds Obligated: _____

5. Matching Funds/ In-Kind: _____

6. Value Release Time: _____

2. No. Served at Each Site to Date:

| | |
|---|---|
| Site 1. 95 | Site 8. 107 |
| Site 2. 25 | Site 9. 6 |
| Site 3. 10 | Site 10. 18 |
| Site 4. 45 | Site 11. 13 |
| Site 5. 8 | Site 12. 11 |
| Site 6. 7 | Site 13. 7 |
| Site 7. 11 | Site 14. 13 |

7. No. Participating in Programs Offered

| | |
|---|---|
| Basic Skills | 276 |
| GED | |
| ESL | 100 |

3. Total No. Served: 376

8. Contact Hours Provided: _____

| | | | |
|---|---|---|---|
| Site 1 | Hughes | Site 8 | Burr-Brown |
| Site 2 | Brush Wellman | Site 9 | Westward Look |
| Site 3 | Louv-Aire | Site 10 | AlliedSignal |
| Site 4 | Concrete Designs | Site 11 | Westin La Paloma |
| Site 5 | IBM | Site 12 | TriTronics |
| Site 6 | U of A | Site 13 | Alpha |
| Site 7 | Tucson Rubber | Site 14 | Groundskeeper |

**Part 2: Participation Data**

1. Mean Age Participants: 39

2. Sex: No. Males 141 No. Females 235

3. Race/Ethnicity: No. who are:

| | |
|---|---|
| White 153 | Am. Indian/ |
| Black 12 | Alaska Native 7 |
| Hispanic 140 | Asian/Pacific |
| | Islander 64 |

4. No. Single Head of Household: 120

5. No. Limited English Proficient: 107

| Outcomes | No. Participants |
|---|---|
| a. Tested higher on basic skills | 208 |
| b. Improved communication skills | 134 |
| c. Increased productivity | |
| d. Improved attendance at work | |
| e. Increased self-esteem | 376 |

| 7. Years with the company | No. Participants |
|---|---|
| Unemployed | |
| 0-5 | 181 |
| 6-10 | 120 |
| 11-15 | 50 |
| 16-over | 25 |

**NATIONAL WORKPLACE LITERACY PROGRAM**
**INFORMATION FORM**

**Pima County Adult Education**
**Workplace Education Project**
**May 1, 1992 - April 30, 1995**
**NON-COMPLETERS**

**Part 1: Program Parameters**

1. Target No. to be Served: 300
   a. Total No. Served: 524
   b. No. of Non-Completers: 148

4. Fed. Funds Obligated: _____

5. Matching Funds/ In-Kind: _____

6. Value Release Time: _____

2. No. Served at Each Site to Date:

| | | | |
|---|---|---|---|
| Site 1. | 74 | Site 8. | 23 |
| Site 2. | 11 | Site 9. | 3 |
| Site 3. | 4 | Site 10. | |
| Site 4. | 9 | Site 11. | 5 |
| Site 5. | 3 | Site 12. | 1 |
| Site 6. | 3 | Site 13. | 4 |
| Site 7. | 2 | Site 14. | 6 |

7. No. Participating in Programs Offered

| | |
|---|---|
| Basic Skills | 113 |
| GED | |
| ESL | 35 |

3. Total No. of Non-Completer: 148

8. Contact Hours Provided: _____

| | | | |
|---|---|---|---|
| Site 1 | Hughes | Site 8 | Burr-Brown |
| Site 2 | Brush Wellman | Site 9 | Westward Look |
| Site 3 | Louv-Aire | Site 10 | AlliedSignal |
| Site 4 | Concrete Designs | Site 11 | Westin La Paloma |
| Site 5 | IBM | Site 12 | TriTronics |
| Site 6 | U of A | Site 13 | Alpha |
| Site 7 | Tucson Rubber | Site 14 | Groundskeeper |

**Part 2: Participation Data**

1. Mean Age Participants: 38

2. Sex: No. Males 45 No. Females 103

3. Race/Ethnicity: No. who are:

| | | | |
|---|---|---|---|
| White | 68 | Am. Indian/ Alaska Native | 2 |
| Black | 2 | | |
| Hispanic | 63 | Asian/Pacific Islander | 13 |

4. No. Single Head of Household: 49

5. No. Limited English Proficient: 35

| Outcomes | No. Participants |
|---|---|
| a. Tested higher on basic skills | 4 |
| b. Improved communication skills | 9 |
| c. Increased productivity | |
| d. Improved attendance at work | |
| e. Increased self-esteem | 16 |

| 7. Years with the company | No. Participants |
|---|---|
| Unemployed | |
| 0-5 | 81 |
| 6-10 | 44 |
| 11-15 | 11 |
| 16-over | 12 |

# APPENDIX

# Pima County Adult Education
# Workplace Education Project

Linda Hellman, Manager

# Generic Workplace Curricula & Competencies

Curriculum Developers
Elaine Dow and Margie Olson - ESOL
Jane Brown, Frank Myers, and Brad Hollis - Basic Skills

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**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**ESOL CURRICULUM**

| TASKS/COMPETENCIES | FUNCTIONS |
|---|---|
| **PERSONAL INFORMATION** | |
| • identify and give job titles of self and some co-workers<br>• introduce self to co-workers<br>• give address and phone number | • asking for⇔giving information<br>• introducing |
| **SOCIALIZING AT WORK** | |
| • greet co-workers, boss and other work acquaintances<br>• ask about co-workers' families and activities<br>• describe family and leisure activities | • greeting⇔taking leave<br>• asking for⇔giving opinions<br>• describing events, problems, situations<br>• making small talk |
| **TOOLS, SUPPLIES, EQUIPMENT AND MATERIALS** | |
| • identify, ask for, give and describe tools and supplies required for a task<br>• respond to oral and written requests for supplies, tools, materials and equipment<br>• locate items needed to complete a task<br>• direct someone to a location<br>• explain company clothing requirements<br>• explain the danger of specific hazardous materials | • asking for⇔giving directions, instructions, information, reasons, permission<br>• asking for⇔supplying requested materials<br>• expressing wants, desires, needs<br>• informing |
| **LEARNING, DOING AND TEACHING THE JOB** | |
| • follow instructions in sequential order to complete a procedure<br>• ask for clarification/help to complete a procedure<br>• describe job duties<br>• describe a procedure just completed<br>• describe anomalies in a common procedure | • checking⇔indicating understanding<br>• asking for, offering and accepting help<br>• asking for clarification and repetition⇔clarifying, correcting, summarizing, repeating<br>• describing events, problems, situations, processes<br>• expressing ability⇔inability |

| | |
|---|---|
| • describe problems on the job<br>• explain a mistake<br>• explain reasons for being able⇔unable to complete a task<br>• identify/differentiate between satisfactory and unsatisfactory products or services<br>• explain work tolerances<br>• verify a new process or procedure<br>• suggest solutions/improvements to a problem with products, processes or equipment<br>• answer customers'/guests' questions regarding products, services or locations<br>• look up and follow written instructions/specs to carry out a task<br>• read, interpret, plot and explain data on charts, graphs and diagrams<br>• read, interpret, fill out and explain necessary paperwork<br>• give verbal and written messages/pass downs to co-workers and supervisors<br>• respond to oral and written requests for help/information<br>• respond appropriately to criticism or praise from supervisors/trainers | • admitting⇔denying<br>• suggesting, recommending and asking for advice<br>• asking for⇔giving opinions<br>• expressing certainty, doubt, suspicion<br>• informing |
| **WORKING IN TEAMS** | |
| • suggest improvements in a product or process<br>• ask for clarification, repetition<br>• agree or disagree with a policy, procedure or suggestion<br>• participate in brainstorming and other group processes<br>• notify co-workers of an impending meeting<br>• set a meeting<br>• facilitate a meeting<br>• take minutes of a meeting<br>• summarize proceedings of a meeting | • suggesting, recommending<br>• asking for clarification, correction, repetition⇔clarifying, correcting, repeating, summarizing<br>• agreeing⇔disagreeing<br>• expressing likes, dislikes, preferences<br>• interrupting<br>• informing<br>• mediating, negotiating, conceding, compromising |

| HEALTH AND SAFETY | |
|---|---|
| • read and explain company safety regulations<br>• read and explain hazardous warning labels<br>• read and explain antidotes for hazardous workplace materials<br>• respond appropriately to written and oral warnings of danger<br>• warn a co-worker of imminent danger<br>• report an accident verbally and in writing | • describing events, problems, situations, processes<br>• clarifying, summarizing<br>• reminding<br>• interrupting<br>• cautioning |
| **COMPANY POLICY, PAY AND BENEFITS** | |
| • fill out job application, time cards, tax and benefit forms<br>• state preference of hours, shift, assignment and training<br>• call in sick or late<br>• read, follow and explain work schedules and notices<br>• read, follow and explain company handbook including benefits: attendance and leave policy<br>• ask about⇔explain changes in payroll deductions<br>• request leave or vacation time | • asking for⇔giving directions, instructions, information, reasons, permission<br>• asking for clarification, correction, repetition⇔clarifying, correcting, repeating, summarizing<br>• expressing likes, dislikes, preferences, needs, opinions<br>• making⇔accepting excuses<br>• mediating, negotiating, conceding, compromising |
| **PERFORMANCE REVIEW** | |
| • participate in performance review meetings<br>• request feedback from supervisor on job performance<br>• respond appropriately to criticism⇔praise from supervisor<br>• ask about opportunities/requirements for promotion<br>• set annual performance goals | • asking for information, clarification opinions<br>• mediating, negotiating, conceding, compromising<br>• expressing wants, desires, needs |

Not all tasks and functions are taught at every worksite nor for every job category. The ESOL teacher selects from these items to design a curriculum appropriate to each class.

Extensive yet possibly distinct vocabulary is required for each task and each worksite. Tasks may include reading, writing, listening and/or speaking activities.

# PIMA COUNTY ADULT EDUCATION
## WORKPLACE EDUCATION PROJECT
### READING SKILLS COMPETENCIES

I. READ, EXPLAIN AND FOLLOW INSTRUCTIONS.

II. READ AND FOLLOW DETAILED, SEQUENTIAL DIRECTIONS TO COMPLETE A TASK.

III. READ AND INTERPRET WORK ORDERS.

IV. APPLY SPECIFICATIONS TO A SPECIFIC JOB.

V. READ AND EXPLAIN COMPANY POLICIES.

VI. READ AND FOLLOW SAFETY REGULATIONS.

VII. IDENTIFY ANTIDOTES TO HAZARDOUS MATERIALS.

VIII. READ AND RESPOND TO PERFORMANCE REVIEWS.

IX. RECOGNIZE MEANINGS OF WORK-RELATED VOCABULARY, ABBREVIATIONS AND ACRONYMS.

X. INTERPRET INFORMATION ON CHARTS, GRAPHS AND DIAGRAMS.

XI. SCAN NARRATIVE MATERIAL FOR RELEVANT INFORMATION.

XII. IDENTIFY DETAILS, LABELS AND SIGNS.

XIII. USE A KEY TO LOCATE AND INTERPRET SYMBOLS ON A SCHEMATIC.

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**GENERIC READING SKILLS CURRICULUM**

1.0 MAIN IDEA
- 1.1 Identifying the Main Idea (stated)
- 1.2 Identifying the Main Idea (unstated)

2.0 GETTING THE FACTS
- 2.1 Identifying the Facts
- 2.2 Finding an Implied Fact
- 2.3 Distinguishing Between Fact and Opinion
- 2.4 Combining Facts
- 2.5 Evaluating Factual Data

3.0 DRAWING CONCLUSIONS
- 3.1 Identifying a Conclusion
- 3.2 Evaluating a Conclusion

4.0 CAUSE AND EFFECT
- 4.1 Identifying Literal Cause and Effect
- 4.2 Identifying Implied Cause and Effect
- 4.3 Evaluating Cause and Effect Statements

5.0 DETAILS
- 5.1 Finding Details in a Paragraph
- 5.2 Identifying Supporting Details in a Paragraph
- 5.3 Identifying Nonsupporting Details in a Paragraph

6.0 SEQUENCING
- 6.1 Determining Ordered Events in a Paragraph
- 6.2 Identifying "Sequencing" Words

7.0 DIRECTIONS
- 7.1 Following Literal Written Directions
- 7.2 Determining Direction Sequence

8.0 UTILIZING INFORMATION
- 8.1 Utilizing Information from Pictures, Maps, Signs, Diagrams, Tables, Charts, Graphs and Schedules
- 8.2 Utilizing Information from Indexes, Tables of Contents and the Dictionary

9.0 COMPARISON AND CONTRAST

10.0 SUMMARIZING AND PARAPHRASING
- 10.1 Summarizing a Written Interview
- 10.2 Paraphrasing a Narrative

11.0 STRUCTURE
- 11.1 Recognizing Structural Elements in a Reading Selection
- 11.2 Analyzing Structural Elements in a Reading Selection

12.0 CRITICAL THINKING SKILLS
- 12.1 Identifying Author's Writing Techniques
- 12.2 Identifying Author's Purpose
- 12.3 Analyzing Organizational Relationships

13.0 SKIMMING AND SCANNING
- 13.1 Distinguishing Between Revelant and Irrelevant Information

14.0 VOCABULARY
- 14.1 Recognizing Root Word
- 14.2 Recognizing Suffixes and Prefixes
- 14.3 Understanding Compound Words
- 14.4 Antonyms, Synonyms and Homonyms
- 14.5 Workplace Specific Vocabulary

15.0 APPLIED READING SKILLS
- 15.1 Company Newsletters
- 15.2 Safety Regulations
- 15.3 Employee Handbook
- 15.4 Training Manuals
- 15.5 Specifications
- 15.6 Company Forms
- 15.7 Company Benefits Package
- 15.8 State and/or Federal Regulations

# PIMA COUNTY ADULT EDUCATION
## WORKPLACE EDUCATION PROJECT
### WRITING SKILLS COMPETENCIES

I. FILL OUT PERSONNEL AND OTHER WORK-RELATED FORMS.

II. REQUEST MATERIALS OR SUPPLIES IN WRITING.

III. LIST ALL SUPPLIES AND MATERIALS NEEDED FOR A TASK.

IV. REWRITE EXISTING SPECS IN COMMON LANGUAGE.

V. SUBMIT A SUGGESTION FOR IMPROVEMENT OF WORK PROCESS, SAFETY, OR EQUIPMENT.

VI. DESCRIBE A PROCESS OR AN EVENT IN SEQUENTIAL ORDER.

VII. WRITE INCIDENT REPORT.

VIII. RECORD INFORMATION ON CHARTS AND GRAPHS.

IX. WRITE A NOTE TO ANOTHER EMPLOYEE (PASS DOWNS) DESCRIBING HOW THEY MIGHT CONTINUE A TASK.

X. WRITE/RESPOND IN WRITING TO A PERFORMANCE EVALUATION.

XI. WRITE A LETTER.

XII. WRITE/SPELL KEY TECHNICAL WORK-RELATED WORDS AND ABBREVIATIONS CORRECTLY.

XIII. COMPILE AN AGENDA FOR A MEETING.

XIV. TAKE MINUTES OF A MEETING.

XV. WRITE A MEMO OR ANNOUNCEMENT.

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**GENERIC WRITING SKILLS CURRICULUM**

1.0 SENTENCE STRUCTURE
- 1 .1 Subject/Verb
- 1. 2 Fragments/Run-ons
- 1. 3 Simple/Compound/Complex Sentences
- 1. 4 Declarative/Imperative/Interrogative/Exclamatory Sentences

2.0 PARTS OF SPEECH
- 2. 1 Nouns
  - 2.11 Compound Nouns
  - 2.12 Classes of Nouns
    - a. Common
    - b. Proper
    - c. Concrete
    - d. Abstract
    - e. Collective
    - f. Gerunds (Verbal Nouns)
  - 2.13 Properties of Nouns
    - a. Person
    - b. Number
    - c. Gender
    - d. Case
  - 2.14 Uses of Nouns
    - a. Subject of Sentence or Clause
    - b. Predicate Nominative
    - c. Direct Object of a Verb
    - d. Indirect Object of a Verb
    - e. Object of a Preposition
    - f. Appositive
- 2. 2 Pronouns
  - 2.21 Classes of Pronouns
    - a. Personal Pronouns
    - b. Compound Personal Pronouns
    - c. Indefinite Pronouns
    - d. Demonstrative Pronouns
    - e. Interrogative Pronouns
    - f. Relative Pronouns
  - 2.22 Properties of Pronouns
    - a. Person
    - b. Number
    - c. Gender

2. 3 Verbs
- 2.31 Verb
- 2.32 Verb Phrase
- 2.33 Classes of Verbs
  - a. Transitive Verbs
  - b. Intransitive Verbs
- 2.34 Tenses of Verbs
  - a. Present Tense
  - b. Past Tense
  - c. Future Tense
  - d. Present Perfect Tense
  - e. Past Perfect Tense
  - f. Future Perfect Tense
- 2.35 Voice of Verbs
  - a. Active Voice
  - b. Passive Voice
- 2.36 Subject/Verb Agreement

2. 4 Adjectives
- 2.41 Classes of Adjectives
  - a. Descriptive Adjectives
  - b. Demonstrative Adjectives
  - c. Limiting Adjectives
  - d. Proper Adjectives
  - e. Compound Adjectives
- 2.42 Degree Forms of Adjectives
  - a. Positive
  - b. Comparative
  - c. Superlative
- 2.43 Absolute Adjectives

2. 5 Adverbs
- 2.51 Classes of Adverbs
  - a. Manner
  - b. Place
  - c. Time
  - d. Frequency
  - e. Reason
- 2.52 Degree Forms of Adverbs
  - a. Positive
  - b. Comparative
  - c. Superlative

2. 6 Articles

2. 7 Prepositions

2. 8 Conjunctions
  - a. Coordinating Conjunctions
  - b. Correlative Conjunctions
  - c. Conjunctive Adverbs
  - d. Subordinating Conjunctions

2 .9 Interjections

3.0 PHRASES and CLAUSES
- 3. 1 Verb Phrases
- 3. 2 Infinitive Phrases
- 3. 3 Prepositional Phrases
- 3. 4 Gerund Phrases
- 3. 5 Participial Phrases
- 3. 6 Dependent Clauses
- 3. 7 Adjective Clauses
- 3. 8 Adverbial Clauses
- 3. 9 Noun Clauses
- 3.10 Independent Clauses

4.0 PARALLEL CONSTRUCTION

5.0 PUNCTUATION and CAPITAL LETTERS
- 5. 1 Ending Punctuation
- 5. 2 Commas
- 5. 3 Quotation Marks
- 5. 4 Colons
- 5. 5 Semi-Colons
- 5. 6 Hyphens

6.0 PROOFREADING/EDITING
- 6. 1 Correcting Shift in Time
- 6. 2 Correcting Shift in Person
- 6. 3 Correcting Wordiness
- 6. 4 Avoiding Cliches
- 6. 5 Correcting Misplaced Modifiers
- 6. 6 Correcting Plural/Possessive Errors
- 6. 7 Correcting Letters, Memos, Reports
- 6. 8 Expressing Numbers Correctly
- 6. 9 Editing Rough Drafts
- 6.10 Editing for Completeness
- 6.11 Editing for Cohesiveness
- 6.12 Editing for Conciseness
- 6.13 Editing for Clearness
- 6.14 Editing for Courteousness
- 6.15 Editing Business Letters
- 6.16 Editing Business Memos

7.0 WRITING ACTIVITIES
- 7. 1 Writing Narrative Paragraphs
- 7. 2 Writing Persuasive Paragraphs
- 7. 3 Writing Descriptive Paragraphs
- 7. 4 Writing Expository Paragraphs
- 7. 5 Writing Incident Reports
- 7. 6 Resume Writing

7. 7 Business Letters
- 7.71 Request letters
- 7.72 Acknowledgments
- 7.73 Sales letters
- 7.74 Claim and Adjustment letters
- 7.75 Public Relations letters
- 7.76 Goodwill letters
- 7.77 Appreciation letters

7. 8 Memo Writing
7. 9 Report Writing
7.10 Journal Writing
7.11 Free Writing
7.12 Goal Setting
7.13 Performance Appraisals
7.14 Minutes of a Meeting

8.0 SPELLING
8. 1 List of Frequently Misspelled Words
8. 2 Special Consonant Sounds: "s", "sh", "ch", "zh", "j", "f", "k"
8. 3 Double Consonants
8. 4 Silent Consonants
8. 5 Silent Vowels
8. 6 Spelling Errors Related to Pronunciation
8. 7 Reduced Vowel Roots: "a", "e", "er", "i", "o", "or", "u"
8. 8 Reduced Vowel Suffixes: "ent/ence", "ant/ance", "or/ar", "able/ible", "le/el/al/", "ary/ery/ory", ain/on/om", "acy/asy"
8. 9 Rule for Doubling Final Consonants
8.10 Individual List of Misspelled Words
8.11 Words Often Confused
8.12 Words That Sound Alike
8.13 Possessives
8.14 Contractions

# PIMA COUNTY ADULT EDUCATION
## WORKPLACE EDUCATION PROJECT
### MATH SKILLS COMPETENCIES

I. COMPUTE WITH FRACTIONAL, DECIMAL AND PERCENTAGE COMPONENTS.

II. EMPLOY THE CONCEPT OF NEGATIVE AND POSITIVE INTEGERS.

III. FIND AVERAGES OF LISTINGS INCLUDING NEGATIVE AND POSITIVE NUMBERS.

IV. READ AND INTERPRET TABLES, GRAPHS AND CHARTS.

V. ASSIMILATE INFORMATION FROM TWO OR MORE DIFFERENT SOURCES TO SOLVE A PROBLEM.

VI. USE ESTIMATION TECHNIQUE IN PROBLEM-SOLVING.

VII. CALCULATE PERIMETER, AREA AND VOLUME IN GEOMETRIC EQUATIONS.

VIII. HAVE KNOWLEDGE OF ALGEBRAIC TERMS AND APPLICATIONS IN A GIVEN ENVIRONMENT.

IX. DEFINE & CALCULATE MEAN, MEDIAN AND MODE.

X. INTERPRET AND PLOT RANGES AND BASIC STANDARD DEVIATION.

XI. DETERMINE THE VALUES IN RATIO AND PROPORTION. COMPUTATIONS.

XII. CONVERT BASIC METRIC TERMS TO ENGLISH AND VICE VERSA.

XIII. MEASURE IN ENGLISH & METRIC UNITS.

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**GENERIC MATH FUNDAMENTALS CURRICULUM**

1.0 WHOLE NUMBERS SKILLS
- 1. 1 Place Value
- 1. 2 Addition and Computation and Applications
- 1. 3 Subtraction Computation and Applications
- 1. 4 Multiplication Computation and Applications
- 1. 5 Division Computation and Applications
- 1. 6 Averages

2.0 FRACTION SKILLS
- 2. 1 Introduction to Fractions
  - a. Numerator
  - b. Denominator
  - c. Proper Fractions
  - d. Improper Fractions
  - e. Reducing Fractions
  - f. Comparing Fractions
- 2. 2 Addition of Fractions Computation and Applications
- 2. 3 Subtraction of Fractions Computation and Applications
- 2. 4 Multiplication of Fractions Computation and Applications
- 2. 5 Division of Fractions Computation and Applications

3.0 DECIMAL SKILLS
- 3. 1 Reading Decimals
- 3. 2 Writing Decimals
- 3. 3 Comparing Decimals
- 3. 4 Addition of Decimals Computations and Applications
- 3. 5 Subtraction of Decimals Computations and Applications
- 3. 6 Multiplication of Decimals Computations and Applications
- 3. 7 Division of Decimals Computation and Applications

4.0 PERCENT SKILLS
- 4.1 Finding a Percent of a Number
- 4.2 Finding Percents Applications
- 4.3 Finding a Number When a Percent is Given
- 4.4 Determining Percent Increase and Decrease
- 4.5 Using Percents: The Percent Circle

5.0 MATH INTEGRATION
- 5.1 Changing Fractions to Decimals
- 5.2 Changing Fractions to Percents
- 5.3 Changing Decimals to Fractions
- 5.4 Changing Decimals to Percents
- 5.5 Changing Percents to Decimals
- 5.6 Changing Percents to Fractions
- 5.7 Decimal Percents
- 5.8 Fractional Percents

6.0 APPROXIMATION
- 6.1 Using approximation in Problem Solving
- 6.2 Using approximation in Word Problems

7.0 MEASUREMENT SKILLS
- 7.1 English Measurement
- 7.2 Metric Measurement

8.0 INTEREST FORMULA
- 8.1 Interest
- 8.2 Definition of Rate
- 8.3 Definition of Time
- 8.4 Interest Earned
- 8.5 Interest Paid
- 8.6 Finding the Total Owed
- 8.7 Finding the Balance Owed
- 8.8 Computing Interest for Part of the Year

9.0 DATA ANALYSIS SKILLS
- 9.1 Finding the Mean
- 9.2 Finding the Median
- 9.3 Finding the Range
- 9.4 Finding the Ratio
- 9.5 Displaying Numerical Data

10.0 GRAPH SKILLS
- 10.1 Pictograph
- 10.2 Bar Graph
- 10.3 Circle Graph
- 10.4 Line Graph

11.0 PROBABILITY

12.0 MATHEMATICAL FORMULAS

- 12.1 Ration
- 12.2 Proportion
- 12.3 Area
  - a. Computing the area of a square
  - b. Computing the area of a rectangle
  - c. Computing the area of a parallelogram
  - d. Computing the area of a triangle
  - e. Computing the area of a circle
- 12.4 Perimeter
  - a. Computing the area of a square
  - b. Computing the area of a rectangle
  - c. Computing the area of a triangle
  - d. Circumference of a circle
- 12.5 Volume
  - a. Computing the volume of a cube
  - b. Computing the volume of a rectangle
  - c. Computing the volume of a cylinder

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**S.P.C. SKILLS COMPETENCIES**

I. **COLLECT VARIABLE AND ATTRIBUTE DATA.**

II. **RANK, ADD AND SUBTRACT SIGNED NUMBERS.**

III. **FIND MEAN, MEDIAN, AND RANGE OF DECIMALS, WHOLE NUMBERS AND SIGNED NUMBERS.**

IV. **INTERPRET GRAPHS.**

V. **PLOT POINTS ON S.P.C. CHARTS.**

VI. **SOLVE PROBLEMS USING S.P.C. CHART PATTERNS.**

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**MATH FOR GENERIC S.P.C. CURRICULUM**

**1.0 DATA COLLECTION**
- 1.1 Types of Data
  - a. Variable Data
  - b. Attribute Data
- 1.2 Tally Charts and Check Sheets

**2.0 MATH SKILLS FOR S.P.C.**
- 2.1 Using A Calculator
- 2.2 Finding The Mean
- 2.3 Finding The Median
- 2.4 Finding The Range
- 2.5 Rounding
- 2.6 Finding Percent

**3.0 GRAPHING SKILLS FOR S.P.C.**
- 3.1 Principles of Graphing
  - a. Reading Axes
  - b. Plotting Points
  - c. Interpolation
  - d. Control Limits
- 3.2 Variable Control Chart
- 3.3 Attribute Control Chart
- 3.4 Other Chart Types

**4.0 S.P.C. PROBLEM SOLVING**
- 4.1 In Control And Out Of Control
- 4.2 Interpreting Control Chart Patterns
- 4.3 Histograms
- 4.4 Pareto Analysis
  - a. Benefits
  - b. Procedure

**5.0 APPLICATION**

Specific applications of these principles will depend upon the idiosyncratic programs and materials of each company.

# PIMA COUNTY ADULT EDUCATION
## WORKPLACE EDUCATION PROJECT
## ALGEBRA SKILLS COMPETENCIES

I. INTERPRET ALGEBRAIC LANGUAGE.

II. CALCULATE USING SIGNED NUMBERS.

III. USE EXPONENTS AND SQUARE ROOTS.

IV. READ AND APPLY FORMULAS.

V. SOLVE EQUATIONS WITH ONE OR MORE UNKNOWNS.

VI. CALCULATE PERIMETER, AREA AND VOLUME.

VII. MAKE A RATION/PROPORTION CALCULATION.

VIII. RECOGNIZE POLYNOMIALS, LIKE TERMS AND COEFFICIENTS.

IX. GRAPH RECTANGULAR COORDINATES AND NON-LINEAR EQUATIONS.

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**GENERIC ALGEBRA CURRICULUM**

1.0 ALGEBRAIC LANGUAGE
- 1.1 Using Letters for Numbers
- 1.2 Showing Operations in Equations
  - a. Adding
  - b. Subtracting
  - c. Multplying
  - d. Dividing
- 1.3 Exponents
  - a. What are Exponents?
  - b. Using Exponents
- 1.4 Square Roots
  - a. What are Square Roots?
  - b. Calculating an Approximate Square Root
- 1.5 Using Parentheses
- 1.6 Order of Operations
- 1.7 Formulas
  - a. Reading Formulas
  - b. Applying Formulas
- 1.8 Applications
  - a. F to C Formula
  - b. Find Area in English Units
  - c. Find Area in Metric Units
  - d. Apply Simple Interest Formula
  - e. Apply Compound Interest Formula
  - f. Change English to Metric Units
  - g. Change Metric to English Units
  - h. Find Circumference & Perimeter in English Units
  - i. Find Circumference & Perimeter in Metric Units

2.0 SIGNED NUMBERS
- 2.1 Number Line
- 2.2 Ordering Signed Numbers
- 2.3 Add Signed Numbers
- 2.4 Subtract Signed Numbers
- 2.5 Multiply Signed Numbers
- 2.6 Divide Signed Numbers
- 2.7 Applications
  - a. Reading a Digital Scale with Signed Numbers
  - b. Reading an Analog Scale with Signed Numbers
  - c. Finding the Mean with Signed Numbers
  - d. Finding the Median with Signed Numbers
  - e. Finding the Range with Signed Numbers

3.0 SOLVING EQUATIONS WITH 1 UNKNOWN
- 3.1 What is an equation?
- 3.2 Solve by Subtraction
- 3.3 Solve by Addition
- 3.4 Solve by Division
- 3.5 Solve by Multiplication
- 3.6 Solve Fractional Equation
- 3.7 Solve by 2 Steps
- 3.8 Solve by Collecting Terms
  - a. Collecting Terms on 1 Side
  - b. Collecting Terms on Both Sides
- 3.9 Solve Equations with Parentheses
- 3.10 Applications
  - a. Assigning Variables to Real Problems
  - b. Setting Up an Equation for Real Problems
  - c. Rate of Work Problems
  - d. Mixture Problems with Chemicals

4.0 RATIO AND PROPORTION
- 4.1 What is Ratio?
- 4.2 Setting Up and Reducing Ratio
- 4.3 What is Proportion?
- 4.4 Setting Up a Proportion
- 4.5 Solving a Proportion Problem
- 4.6 Applications
  - a. Mixing Paint
  - b. Making Medicinal Solutions
  - c. Making Chemical Solutions
  - d. Mixing Cement

5.0 SOLVING EQUATIONS WITH 2 UNKNOWNS
- 5.1 Rearranging Equations
- 5.2 Substituting to Solve

6.0 POLYNOMIALS
- 6.1 Naming Polynomials
  - a. Coefficients, Unknowns, Terms
- 6.2 Recognizing Like Terms
- 6.3 Adding & Subtracting Like Terms
- 6.4 Multiplying & Dividing Like Terms
- 6.5 Exponents in Polyunomials
  - a. Multiplying Exponents
  - b. Divding Exponents

7.0 GRAPHING

- 7.1 What are Rectangular Coordinates?
- 7.2 Writing Coordinates as an Ordered Pair
- 7.3 Plotting Coordinates on Cartesian Plane
- 7.4 Plot the Equation of a Line
- 7.5 Find the X and Y Intercepts of a Line
- 7.6 Slope
  - a. Understanding Slope
  - b. Computing Slope
- 7.7 Graphing Non-Linear Equations
- 7.8 Applications
  - a. Graph Production Data
  - b. Find Distance Between 2 Points

# PIMA COUNTY ADULT EDUCATION
## WORKPLACE EDUCATION PROJECT
### COMMUNICATION/LISTENING SKILLS COMPETENCIES

I. **RECOGNIZE YOUR OWN AND OTHERS' DIFFERING COMMUNICATION STYLES.**

II. **LISTEN CAREFULLY, COMPLETELY, AND CRITICALLY.**

III. **RESOLVE CONFLICTS.**

- A. Give I-messages
- B. Cope and work with difficult
  1. co-workers
  2. supervisors
  3. subordinates

IV. **RECOGNIZE AND USE NON - VERBAL BEHAVIOR APPROPRIATELY AND EFFECTIVELY.**

V. **NEGOTIATE SO THAT EVERYONE WINS.**

VI. **ASSERT YOURSELF NON-AGGRESSIVELY**

VII. **COMMUNICATE AS A TEAM AND WITHIN A TEAM.**

VIII. **TRAIN OTHER WORKERS USING EFFECTIVE, CLEAR, SUCCINCT LANGUAGE.**

IV. **EXPLAIN AND COMMUNICATE COMPANY POLICIES, PRODUCT, VALUES AND GOALS.**

X. **DESCRIBE YOUR JOB AND ITS IMPORTANCE IN THE OVERALL PICTURE OF THE COMPANY.**

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**GENERIC COMMUNICATION/LISTENING SKILLS CURRICULUM**

1.0 COMMUNICATION STYLE
- 1.1 How to Recognize and Manage the Image You Communicate
- 1.2 Verbal Components of Behavior
  - 1.21 Non-Assertive
  - 1.22 Assertive
  - 1.23 Aggressive
- 1.3 Nonverbal Components of Behavior
  - 1.31 Non-Assertive
  - 1.32 Assertive
  - 1.33 Aggressive

2.0 HOW TO COMMUNICATE THE MESSAGE YOU WANT
- 2.1 Negative
  - 2.11 Facial Expression
    - a. Tensing/wrinkling forehead
    - b. Pursed, tight-lipped mouth
    - c. Swallowing repeatedly
    - d. Insincere/inappropriate smile
    - e. Wetting lips
  - 2.12 Eye Contact
    - a. Staring
    - b. Blinking rapidly/squinting
    - c. Avoiding contact
    - d. Shifting head/eyes excessively
  - 2.13 Gestures and Posture
    - a. Covering mouth when speaking
    - b. Scratching head, rubbing eyes/neck
    - c. Playing with jewelry/clothing
    - d. Wandering, pacing, freezing
    - e. Preening
    - f. Crossing arms/angling head
    - g. Hostile stance
    - h. Looking down on someone
  - 2.14 Other
    - a. Nervous laugh
    - b. Irritating tone
    - c. Mumbling
- 2.2 Positive
  - 2.21 Facial Expression
  - 2.22 Eye Contact
  - 2.23 Gestures and Posture

3.0 HOW TO DEAL WITH DIFFICULT PEOPLE AND SITUATIONS

3.1 Identifying types of difficult people

3.11 The bull

a. Identifying the behavior

b. Understanding and Coping with the Bull

3.12 The Fox

a. Identifying the behavior

b. Understanding and Coping with the Fox

3.13 The Time Bomb

a. Identifying the behavior

b. Understanding and Coping with the Time Bomb

3.14 The Whiner

a. Identifying the behavior

b. Understanding and Coping with the Whiner

3.15 The Stone Wall

a. Identifying the behavior

b. Understanding and Coping with the Stone Wall

3.16 The Ultra-Agreeable

a. Identifying the behavior

b. Understanding and Coping with the Ultra-Agreeable

3.17 The Negativist

a. Identifying the behavior

b. Understanding and Coping with the Negativist

3.18 The Know-It-All Experts

a. Identifying the behavior

b. Understanding and Coping with the Know-It-All

3.19 The Bumps-On-A-Log

a. Identifying the behavior

b. Understanding and Coping with the Bumps-On-A-Log

3.2 Conflict Resolution

3.21 Steps for problem-solving

a. Treat the other person with respect

b. Identify and describe the problem

c. Confirm that you were heard and understood

d. Solicit others' needs

e. Check understanding of others' needs

f. State your own needs

g. Negotiate a solution

h. Follow up on solution

3.22 Conquer the fear of conflict

3.3 Techniques for Handling Negative Behaviors

3.31 Broken Record: Calm repetition--saying what you want over and over gain--will eventually get through.

3.32 Fogging: Teaches acceptance of manipulative criticism by calmly acknowledging to your critic that there may be some truth in what is said, yet allows you to remain your own judge of what you do.

3.33 Negative Assertion: A skill that teaches acceptance of your errors and

faults (without having to apologize) by strongly and sympathetically agreeing with hostile or constructive criticism of your negative qualities.

3.34 Negative Inquiry: A method of desensitizing you to criticism from people you care about so you can listen to what they tell you, extinguish repetitive and manipulative criticism from these people and reduce the use of right-and-wrong structure.

3.35 Limit-Setting: Involves teaching another person how you expect to be treated (this includes teaching others how to give you negative feedback while defusing their anger and resentment)--the method is to disagree with the comment and make a self-affirmative statement.

3.4 Handling Criticism or Putdowns

3.5 Defusing the Explosive Nature of Tense Confrontations

4.0 COMMUNICATION SKILLS THAT MOTIVATE, INFLUENCE AND GAIN OTHERS' COOPERATION

4.1 The Universal Law of Negotiation

How to start out on equal (or better) footing

4.2 Strategies That Will Make You a More Powerful Negotiator

4.21 Assess the organizational climate

4.22 Identify the players

4.23 Develop and nurture a "win-win" attitude

4.24 Give permission to disagree

4.25 Identify issue as joint problem

4.26 Listen

4.27 Acknowledge emotions, but focus on facts

4.28 Explore all solutions

4.29 Reaffirm positive feelings

4.3 Saying It With Style--A Concise Method of Persuasion

5.0 AN IMPORTANT COMMUNICATION SKILL--LISTENING

5.1 Attending-the First Step to Listening Effectively

5.11 What it is:

5.12 What it involves:

a. Posture of involvement

b. Appropriate body movements

c. Eye contact

d. Non-distracting environment

5.2 Following Skills--Focusing on the Speaker

5.21 Door-openers to get the other person to speak

a. Comment on speaker's body language

b. Invite them to talk

5.22 Don't interrupt--even to offer encouragement

5.23 Ask few, if any, questions

5.24 Be attentively silent

5.3 Reflective Listening and Responding--the Five Skills

5.31 Paraphrasing

5.32 Reflecting feelings--mirroring in words the emotions communicated

a. Improving your capacity to "hear" feelings
b. Listen for "feeling words
5.33 Reflecting meanings
5.34 Summarize
5.35 Anticipate

6.0 COMMUNICATION SKILLS THAT SIGNAL YOU'RE TO BE TAKEN SERIOUSLY
6.1 How to Present Your Ideas "Up the Ladder"
6.11 Key work value of the boss
6.12 Match your request/recommendation to the boss's work value
6.13 Adapt to your boss's communication style
6.14 Share expectations
6.2 Steps to Firmly Position Yourself on the Management Team
6.3 How to Clear Your Path of the Most Common Obstacles to Getting Your Point Across
6.31 Communication roadblocks
a. Judging
b. Sending solutions
c. Avoiding others' concerns
6.32 How these roadblocks hinder communication
a. Diminish self-esteem
b. Trigger defensiveness, resistance and resentment
6.33 Overcome the obstacles
a. Be aware of roadblocks
b. Stay focused
c. Be assertive
6.4 Getting an Adversary to See Your Point of View
6.5 The Communication Style That Positions You as Member of the Team
6.6 The Informal Channels of Information
6.7 Don't Ignore Gossip...or Pass It On
6.71 The value of gossip
6.72 Know the source
6.73 Your reaction
6.74 Use gossip to your advantage
6.8 The Power Potential of the Telephone
6.9 Getting Credit--Six Ways to Subtly Toot Your Horn

7.0 THE PAYOFFS OF POWERFUL COMMUNICATION SKILLS
7.1 More Authoratative and Professional Image
7.2 Improved Self-Confidence and Increased Self-Esteem
7.3 Better Relationships
7.4 Less Stress

8.0 SELF INVENTORY

# PIMA COUNTY ADULT EDUCATION
## WORKPLACE EDUCATION PROJECT
### PROBLEM-SOLVING SKILLS COMPETENCIES

I. RECOGNIZE YOUR PERSONAL STYLE OF ATTACKING PROBLEMS AND FINDING SOLUTIONS.

II. USE CHARTS AND DIAGRAMS TO IDENTIFY PROBLEMS.

III. BE CREATIVE IN FINDING SOLUTIONS - LOOK AT ALTERNATIVE WAYS OF THINKING.

IV. USE BRAINSTORMING AND NOMINAL GROUP TECHNIQUE TO GENERATE IDEAS AND FIND POSSIBLE SOLUTIONS.

V. IMPROVE YOUR MEMORY WITH MNEMONIC AND OTHER DEVICES.

VI. USE CRITICAL THINKING STRATEGIES.

VII. USE VALID AND LOGICAL ARGUMENT FORMS AND RECOGNIZE INVALID ARGUMENTS.

VIII. MAKE RATIONAL DECISIONS USING NON - EMOTIONAL STRATEGIES.

IX. WORK WITH OTHERS IN A TEAM TO SOLVE PROBLEMS.

X. RECOGNIZE PROBLEMS THAT AFFECT WORK SITUATIONS AND LEARN TO DEFUSE THEM.

**PIMA COUNTY ADULT EDUCATION**
**WORKPLACE EDUCATION PROJECT**
**GENERIC PROBLEM-SOLVING CURRICULUM**

1.0 STRUCTURED PROBLEM-SOLVING TOOLS

- 1.1 Ishikawa Diagram
  - a. Definition
  - b. Usage
  - c. Examples
  - d. Guided practice
  - e. Utilizing the Ishikawa in group problem-solving situations
- 1.2 Check Sheets
  - a. Definition
  - b. Usage
  - c. Examples
  - d. Guided practice
  - e. Utilizing the check sheet in group problem-solving situations
- 1.3 Pareto Diagrams
  - a. Definition
  - b. Usage
  - c. Examples
  - d. Guided practice
  - e. Utilizing the pareto diagram in group problem-solving situations
- 1.4 Histogram Diagram
  - a. Definition
  - b. Usage
  - c. Examples
  - d. Guided practice
  - e. Utilizing the histogram in group problem-solving situations
- 1.5 Scattergram Diagram
  - a. Definition
  - b. Usage
  - c. Examples
  - d. Guided practice
  - e. Utilizing the scattergram in group problem-solving situations
- 1.6 Control Chart
  - a. Definition
  - b. Usage
  - c. Examples
  - d. Guided practice
  - e. Utilizing the control chart in group problem-solving situations
- 1.7 Flowcharting
  - a. Definition
  - b. Usage
  - c. Flowchart symbols
  - d. Examples

e. Guided practice
f. Utilizing the flowchart in the group problem-solving situations

1.8 Problem-Solving Steps
a. Identifying and selecting the problem
b. Analyzing the problem
c. Generating potential solutions
d. Selecting and planning solutions
e. Implementing solutions
f. Evaluating the solution

1.9 Problem-Solving Techniques
a. Brainstorming
b. Nominal Group Technique

2.0 CREATIVE PROBLEM SOLVING

2.1 Mental Blocks
a. The right answer
b. That's not logical
c. Follow the rules
d. Be practical
e. Play is frivolous
f. Not my area
g. Avoid ambiguity
h. To err is wrong
i. I'm not creative

2.2 Creative Techniques
a. Look for the second right answer
b. Generate a lot of ideas
c. Change your question
d. Soft and Hard Thinking
e. Metaphorical thinking patterns
f. Patterns
g. Challenging the rules
h. What If
i. Imagine how others would do it
j. The stepping stone
k. Cross-fertilization
l. Be an employer
m. Thinking ambiguously
n. Random Information
o. Groupthink
p. Reverse your viewpoint
q. A different logic
r. Take risks
s. Get rid of excuses

2.3 The Creative Process
a. Imaginative
b. Practical

June 29, 1995

Pima County Adult Education
Workplace Education Project
Final Evaluation Report

From May 1, 1993 through April 30, 1995, I was the outside evaluator for the Pima County Adult Education Workplace Education Project. In my role as evaluator, I reviewed and provided feedback to project staff on assessment, curriculum, staff development, partnership roles, institutionalization, and changes caused by economic events or federal decisions. The feedback, both formal and informal, were incorporated into project activities on an ongoing basis, and the project manager's quarterly and final report(s) reflect these recommendations. In addition, the project manager Linda Hellman, and I met on a regular basis throughout the project to ensure the integration of the formative evaluation results.

There were five formal site visits during the grant period: June, 1993; November, 1993; June, 1994; November, 1994; and December, 1994. For the last meeting in December, five project instructors came to Glendale Community College where we toured the high tech (computer) centers and reviewed reading, writing, math, and ESL software and met with various GCC instructors. For each of the other visits, Linda prepared an agenda which included a meeting with her staff, meetings with business partners and students, and observations of classes. After each site visit, Linda and I met to discuss my observations, and she made note of recommended changes. Linda's quarterly reports and final report include these comments.

As in previous years, the Workplace Education Project exceeded the projected number of clients served. The project served 524 workers (original objective was 300), 58% of whom were minority. Fourteen worksites, including five small businesses, were served. Math and ESOL comprised the majority of the classes, but the Project also provided communication/listening, writing, and algebra classes.

One of the outstanding accomplishments of the Project was the design of a generic curriculum and competencies for each subject area. Rather than begin anew at each job site, instructors adapted the generic curriculum to the specific site. These materials have been generously shared with other workplace programs throughout the country. In fact, project staff have made numerous presentations both locally and nationally explaining the curriculum and the process.

While workers who completed the classes showed substantial gains in pre/post scores on basic skills, improved communication skills, and increased self-esteem, it is still problematic to equate program participation with increased productivity, decreased error rates, or turnover. Obviously, there are other concurrent reasons for increased productivity; moreover, managers frequently failed to fill out evaluations that would help document this connection.

The Workplace Education Project applied for but did not receive funding for the period following this grant. The rejection was somewhat of a surprise given the excellent work and international reputation of the Project. However, with the monies provided in previous years, the Workplace Education Project has established itself as an independent, creative provider of basic skills in the workplace. Companies that were involved in the project through federal monies have continued on-site classes by making them part of in-house training and development, and other companies are seeking the Project's help to provide training in addition to basic skills classes. The initial (small) investment of tax dollars to the Workplace Education Project will provide years of basic skills training to hundreds of workers and will do much to improve worker satisfaction and productivity in the Southwest. The Workplace Education Project is and will continue to be an exemplary workplace education program.

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